



# Teacher preparedness and student math achievement

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# Background

The National Council of Teachers of Mathematics developed Common Core State Standards (CCSS) for Mathematics to increase rigor and provide students with the opportunity to learn mathematical concepts in greater depth. Math teachers agree that the CCSS for Math allow for greater equity by aligning states to teach the same standards across the nation, provide equal access to curriculum to impoverished urban settings, and also provide students and teachers the ability to study mathematical concepts in greater detail. However, educators recognize that the implementation process of the CCSS for Math has not been ideal as national scores in mathematics have not risen to an acceptable measure. While a great deal of research, planning and preparation went into the development of the CCSS for Mathematics, little research, planning and preparation went into the equipping of classroom teachers for this task.



# Literature Review

Author	Year	Study Summary	Conclusion
McDuffie, et al.	2017	Mixed method survey of 24 math teachers. Barriers to implementing the CCSS for Math identified: need for more materials that are aligned and in-depth training. Majority of teachers interviewed felt adopted textbooks were not aligned correctly to CCSS.	The research showed teachers are looking for more support in the areas of curriculum, pacing, and professional development
Matlock, et. al.	2015	This survey study addressed teacher views on CCSS implementation, specifically around the following three questions: How do the views of teachers towards the CCSS and its implementation vary by the grade level of the teacher? Vary by the number of years the teachers have taught? Vary by teachers who have thoughts of leaving the profession earlier than initially planned to those not planning on ending a career prematurely?	1,303 surveys collected. Responses from the 66 item survey were overall positive with variations based on length of teaching experience, but these variations were not statistically significant.
Smith & Thier	2017	Study researches the challenges of school leaders in six states when implementing CCSS. Interview questions centered around three research questions: How does local district capacity influence implementation of the CCSS in different states with a variety of education governance arrangements? What resistance to CCSS exists within different states? In what ways do misunderstandings of the intent of CCSS hinder state and local implementation efforts? Six to nine education leaders in each state were interviewed.	Findings were organized into framework of limited capacity, resistance, and misunderstanding intent. Narrative answers included stakeholders mistaking standards for curriculum and a near-universal agreement that educators needed more time.

# Purpose

According to the National Assessment of Educational Progress for mathematics:

- 40% of students in grade 4 score at or above proficient
- 33% of students in grade 8 score at or above proficient

This mixed methods study will examine teacher preparedness and the relationship to student achievement. Using both a constructivist and post positivist framework, the research will focus on a lack of teacher preparedness leading to underperforming student achievement.

## RESEARCH QUESTION #1

Based on teacher likert-type survey responses, is teacher self-efficacy related to student math achievement as measured by the CAASPP Math Summative Assessment in TK-12 schools in Los Angeles County?

## RESEARCH QUESTION #2

From a teacher's perspective, why are students in Los Angeles County underperforming on the CAASPP Math Summative Assessment

# Research design

Mixed-Method

Quantitative

Qualitative

## Mixed-method

According to Johnson and Christensen (2015), the methods of data collection refer to the “technique used to obtain data to be analyzed in a research study” (p. 225). Given both quantitative and qualitative research questions, a mixed methods design of inquiry is best suited for this study. Johnson and Christensen (2015) define the fundamental principle of mixed research as the “thoughtful mixing of methods, procedures, and other paradigm characteristics is an excellent way to conduct high-quality research” (p. 225).

## Quantitative

Question one utilizes a Likert-type survey to elicit teacher self-efficacy beliefs on a broad scale.

## Qualitative

Question two utilizes teacher interviews to qualitatively determine the underlying feelings, values and perceptions of teachers (Cresswell, 2014).



# Sampling and Recruitment

## LIKERT-TYPE SURVEY AND FACE-TO-FACE INTERVIEWS

Study will include 9 elementary, 3 middle and 3 high schools of a suburban Los Angeles TK-12 school district. The unit of study will be teachers and will include all of the roughly 250 classroom math teachers in the district. Using the framework of post positivist and constructivist, math teachers will be sampled in this research to observe the relationship of teacher preparedness and student achievement. Participants will be sampled using a Likert-type survey to assess self-efficacy in the area of math. Surveys will be coded and tabulated.

Research team will use a random sampling technique to determine teacher to interview in order to ensure statistical relevance and generalizability (Cook, Campbell, & Shadish, 2002). Teachers' names will be indexed and selected using a random number generator. Researchers will then conduct face-to-face interviews. The teachers will initially be contacted via email invitation to participate in the study and will be followed-up with a phone call. Interviews are conducted face-to-face at the teacher's school site. A standardized open-ended interview will be employed to gather data about teacher perception of student achievement.



## Survey Design


### RESEARCH QUESTION #1

Based on teacher likert-type survey responses, is teacher self-efficacy related to student math achievement as measured by the CAASPP Math Summative Assessment in TK-12 schools in Los Angeles County?

A quantitative survey design will be employed within a larger concurrent mixed method study (Creswell, 2014).

- ◇ Survey participation will serve as consent to participate
- ◇ Distributed via email link
- ◇ Administered online via SurveyMonkey
- ◇ Data collected digitally via SurveyMonkey
- ◇ Likert-type responses to self-efficacy questions
- ◇ Data correlated to student CAASPP Math performance





# Data Collection and Instrument Protocols

## Interviews

### RESEARCH QUESTION #2

From a teacher's perspective, why are students in Los Angeles County underperforming on the CAASPP Math Summative Assessment

A qualitative interview design will be employed within a larger concurrent mixed method study (Creswell, 2014).

- ◇ Random selection of survey participants
- ◇ Invitation via email with follow up phone call
- ◇ Administered face to face
- ◇ Interview recorded, transcribed and coded
- ◇ Semi-structured questions
- ◇ Data correlated to student CAASPP Math performance





# Data Analysis



To analyze quantitative survey data, responses will be collected via SurveyMonkey and loaded into an Excel spreadsheet. Respondents will be represented individually and identified by school. The results of the Likert-type scale responses will be calculated by level of self-efficacy. Percentages will be calculated for strongly agree, agree, disagree, strongly disagree. Results will be correlated with CAASPP Math data. This will allow for a comparison between teacher self-efficacy and student achievement in math. This analysis will not allow for causal claims between the two variables, as the study is not designed as an experiment (McEwan & McEwan, 2003).

- ◇ To validate the accuracy of the qualitative interview data, the researchers will follow Creswell's (2014) suggestion of a seven-step data analysis to give concrete illustrations of potential codes and themes that might emerge. After collecting raw interview data it will be to organize and prepare the data for analysis by transcribing all interviews and typing field notes within 24 hours. Team will hand code themes and descriptions. Finally, the research team will interpret the meaning of the themes using our conceptual framework.





# Limitations



Researchers have identified the following limitations to the study:

- Study does not take into account transiency of students, and other factors that could affect student math performance
- Teachers interviewed are likely to attribute student math achievement to factors other than themselves (Anderman & Anderman, 2006)



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